

**GHG EMISSION REDUCTION POTENTIAL
OF ENERGY STEP CODE SCENARIOS
City of Maple Ridge**

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EXECUTIVE SUMMARY

The City of Maple Ridge has adopted a target of reducing greenhouse gas (GHG) emissions by 33 percent of 2007 levels by 2020. In 2012, total community GHG emissions for Maple Ridge amounted to 372,667 tonnes of CO₂ equivalent, of which the building stock contributed 125,711 tonnes, equal to 33.7 percent of the total GHG emissions. Of total building stock emissions produced, residential buildings accounted for 72.4 percent and commercial/small to medium industrial buildings accounted for 27.6 percent.¹ As such, targeting residential building GHG emissions is an effective and efficient strategy for supporting the City’s effort in achieving its GHG commitment.

Coming into force in April 2017, the BC Energy Step Code is a voluntary roadmap that establishes progressive steps to transition to constructing net-zero energy-ready buildings by 2032. This provincial standard aims to create healthier, more energy efficient, and more comfortable buildings by establishing measurable performance-based energy-efficiency requirements for new buildings. The BC Energy Step Code has four steps for large, complex buildings (referred to as “Part 3 buildings” in the BC Building Code), and five steps for houses and small buildings (referred to as “Part 9 buildings” in the Building Code)², as illustrated in Figure 1, Figure 2 and Figure 3.

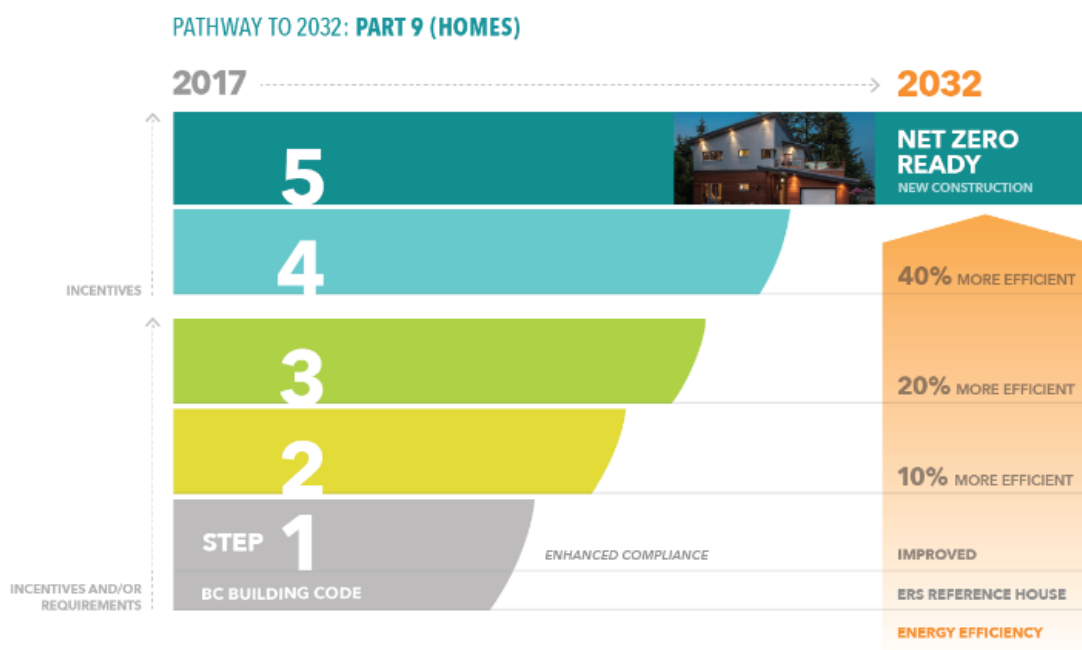


Figure 1: Steps for Part 9 buildings

¹ City of Maple Ridge. Performance Reporting Scorecard, last updated: March 6, 2017

² BC Office of Housing and Construction Standards. Provincial Policy: Local Government Implementation of the BC Energy Step Code (April 2017).

PATHWAY TO 2032: PART 3 (WOOD-FRAME RESIDENTIAL)



Figure 2: Steps for Part 3 buildings (Wood-frame Residential)

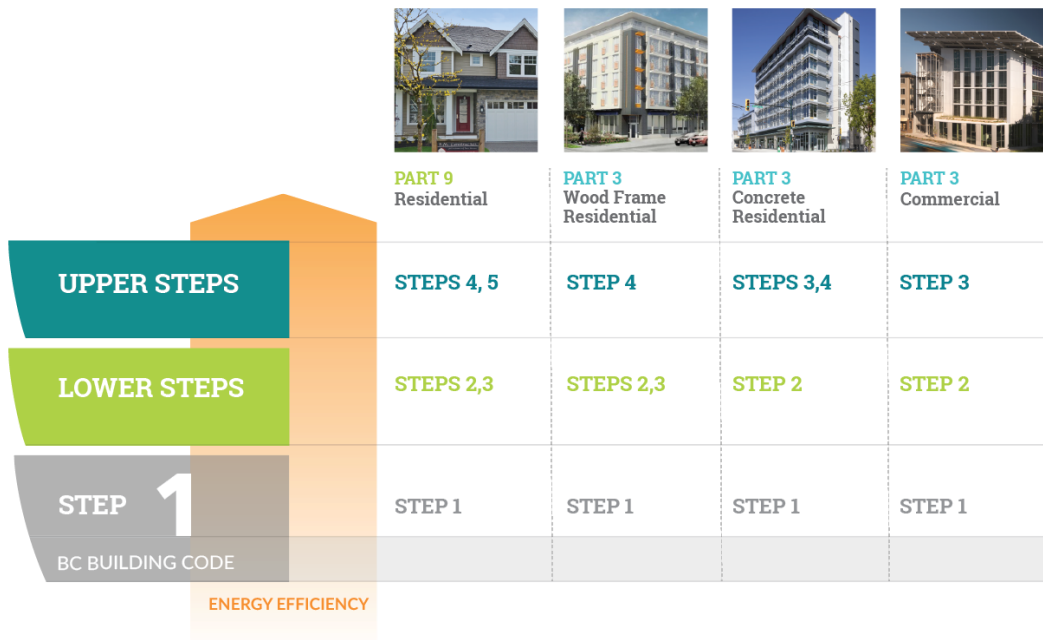


Figure 3: Upper and Lower Steps

The City of Maple Ridge is exploring the potential to use this optional roadmap to encourage more energy-efficient buildings, and at the same time reduce GHG emissions in the city. In addition to following the development of resources and studies undertaken by the Province and BC Housing, the City is collaborating with the UBC Sustainability Scholars Program to implement the “GHG Emissions Reduction Potential of Energy Step Code Scenarios” project, with the support of BC Hydro.

Key project components included: 1) developing possible scenarios for the adoption of the BC Energy Step Code in Maple Ridge; 2) modeling energy and GHG emissions reductions for each scenario; and 3) creating a GHG modelling tool in Excel for development planning purposes.

The analysis and calculations indicated that typical Part 9 buildings have already met TEDI's requirement of lower steps (Step 1, 2 and 3), so the adoption scenarios for Part 9 buildings could be from Step 4 to Step 5. Similarly, the adoption scenarios for Part 3 buildings could be from Step 2 to Step 4.

The calculated results of GHG emissions reduction and energy savings by the adoption of the BC Step Code are as the following:

- For Single Family Detached house of Part 9 buildings, the anticipated GHG emissions reduction and energy savings are from 24 percent to 33 percent for Step 4 and from 54 percent to 60 percent for Step 5.
- For Row housing, as current performance already efficient, the anticipated GHG emissions reduction and energy savings are from 6 percent to 22 percent for Step 5.
- For low-rise apartments of Part 3 buildings, the anticipated GHG emissions reduction and energy savings are from 25 percent to 59 percent for Step 2, from 39 percent to 72 percent for Step 3 and from 53 percent to 86 percent for Step 4.

At City-wide, adoption of the Step Code for Part 9 buildings in Maple Ridge could result in energy savings:

- If Step 4 is adopted by 2020: Potential energy savings are 20,155,896 kWh/year through better performance of the building envelope alone, while total potential energy savings are 34,481,959 kWh/year.
- If Step 5 is adopted by 2020: Potential energy savings are 38,627,501 kWh/year through better performance of the building envelope alone, while total energy savings are 67,768,027 kWh/year.

As a result of energy savings, GHG emissions will be reduced by the adoption of the Step Code. The GHG emissions reduction in Maple Ridge for Part 9 buildings by adoption of the Step Code for Part 9 buildings in Maple Ridge are as the followings:

- If Step 4 is adopted by 2020: Potential GHG emissions reduction is 2,809 tonnes CO₂ equivalent/year through better performance of the building envelope, and total potential GHG emissions reduction is 4,243 tonnes CO₂ equivalent/year.
- If Step 5 is adopted by 2020: Potential GHG emissions reduction is 5,071 tonnes CO₂ equivalent/year through better performance of the building envelope, and total potential GHG emissions reduction is 7,683 tonnes CO₂ equivalent/year.

The expected GHG emissions reduction for the adoption of Step 5 is equivalent to a reduction of 6.1 percent of total building stock emissions in 2012, and equivalent to a reduction of 8.4 percent of total residential building emissions in 2012.

The project identified how the City can leverage the Step Code to fulfill its long-term target of reducing GHG emissions by 2020 as effectively as possible. The project also identified areas needing attention or amendment so as to effectively implement the Step Code. These gaps include the need for additional research to identify a comprehensive impact of the Step Code and a training program to support implementation efforts. In addition, energy modeling and energy data collection in the City should be changed to align with the defined Step Code metrics.